

App. No. 10/825,033
Office Action Dated July 13, 2005

REMARKS

Favorable reconsideration of this application is requested in view of the above amendments and the following remarks. Claims 1, 6, and 9 are amended, and are supported, for instance at page 4, lines 8-19 and at page 13, lines 6-12. Claims 10-12 are added, and are supported for example on page 13, lines 6-12. No new matter has been added. Claims 1-3, 6, and 9-12 are pending.

Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (U.S. Patent No. 6517642). Applicant respectfully traverses this rejection.

Claim 1 is directed to a method for forming a ferroelectric thin film, and recites, among other features, a seed layer with an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%.

Claim 1 provides advantages, such as, obtaining a PZT ferroelectric thin film that may be uniform and have desirable crystallinity. (Page 4, lines 16-19.) Horie et al., however, does not disclose or suggest the features required by claim 1.

Horie et al. is directed to producing a thin film by preparing an ultrafine particle dispersion liquid. Horie et al., however, does not disclose or suggest forming a seed layer specifying an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%. In fact, Horie et al. simply provides for applying an ultrafine particle dispersion liquid to a substrate, where the ultrafine particles are prepared using a mixture ratio of metal materials that may be freely changed. (See for example col. 4, lines 27-52.) Horie et al. does not mention any concentration of weight % that may be desirable for their ultrafine particle dispersion liquid. More particularly, the cited reference does not show or disclose an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%. For at least these reasons, Horie et al. does not disclose the features required by claim 1 and would not reasonably arrive at any of the advantages enjoyed therefrom. Thus, Applicant respectfully submits that claim 1 and dependent claims therefrom are not obvious and allowable over Horie et al.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

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Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (EP 940856) in view of Horie et al. Applicant respectfully traverses this rejection.

Claim 6 is directed to a method for forming a ferroelectric memory including an FET of an MFMS structure. Claim 6 recites, among other features, forming a seed layer having an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%.

Claim 6 provides advantages as claim 1, whereby a PZT ferroelectric thin film may be obtained that may be uniform and have desirable crystallinity. (Page 4, lines 16-19.) Nakamura et al., however, does not disclose or suggest the features required by claim 6.

Nakamura et al. is directed to a ferroelectric memory element. As noted in the rejection, Nakamura et al does not disclose or suggest forming a seed layer with the ultra-fine particle powder as required by claim 6. Further, Nakamura et al. does not show or disclose the seed layer formed with an ultra-fine particle powder present in the specified concentration. Nakamura et al. simply provides a metal ferroelectric metal insulator structure, where source S and drain D regions are formed in a semiconductor substrate 22 with a gate oxidation layer 24 formed between the source and drain regions. A floating gate 26 is formed on the gate oxidation layer 24, with a ferroelectric layer 28 formed on the floating gate 26, and a control gate 30 is formed on the ferroelectric layer 28. (See for example col. 4, lines 31-48 and Figure 1) Nakamura et al., however, does not mention forming a seed layer or specify a weight % concentration for an ultra-fine particle powder. For at least these reasons, Nakamura et al. does not reasonably lead to the features required by claim 6, and would not arrive at any of the advantages enjoyed therefrom. Thus, Applicant respectfully submits that claim 6 is distinguishable over Nakamura et al.

The deficiencies of Horie et al. have been discussed above. Horie et al. does not disclose or suggest forming a seed layer specifying an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%. Thus, Horie et al. fails to provide what is missing from Nakamura et al. For at least these reasons, Applicants respectfully submit that Horie et al. and Nakamura et al. either alone or in combination do not teach or suggest the features required by claim 6. Accordingly, claim 6 is allowable over the references cited.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

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Claims 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (USPN 6020233) in view of Horie et al. Applicant respectfully traverses this rejection.

Claim 9 is directed to a method for forming a ferroelectric memory. Claim 9 recites, among other features, ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%.

Claim 9 provides advantages as mentioned for claim 1, whereby a PZT ferroelectric thin film may be obtained that may be uniform and have desirable crystallinity. (Page 4, lines 16-19.) Kim, however, does not disclose or suggest the features required by claim 9.

Kim is directed to a method for fabricating a ferroelectric memory device. As noted in the rejection, Kim does not disclose or suggest forming a seed layer with the ultra-fine particle powder as required by claim 9. Further, Kim does not show or disclose the seed layer formed with an ultra-fine particle powder present in the specified concentration. In fact, Kim discloses a similar structure as Kim. (See for example col. 4, lines 24-38.) The cited reference, however, does not mention forming a seed layer or specify a weight % concentration for an ultra-fine particle powder. For at least these reasons, Kim does not reasonably lead to the features required by claim 9 and would not arrive at any of the advantages enjoyed therefrom. Thus, Applicants respectfully submit that claim 9 is distinguishable over Kim

The deficiencies of Horie et al. have been discussed above. Horie et al. does not disclose or suggest forming a seed layer specifying an ultra-fine particle powder being present in the seed layer with a concentration in the range of 0.00001 wt% to about 1 wt%. Thus, Horie et al. fails to provide what is missing from Kim. For at least these reasons, Applicants respectfully submit that Horie et al. and Kim either alone or in combination do not teach or suggest the features required by claim 9. Accordingly, claim 9 is allowable over the references cited.

Favorable reconsideration and withdrawal of the rejection are respectfully requested.

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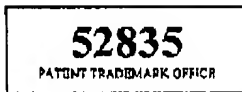
In view of the above, Applicant believes that the pending claims are allowable. Favorable reconsideration in the form of a Notice of Allowance is requested. Any questions regarding this communication can be directed to the undersigned attorney.

Respectfully Submitted,



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